

A qualitative study of determinants of patient behaviour leading to an infection related hospital admission

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Abstract

Objectives To describe and understand the determinants of patients' behaviours surrounding admission to hospital for an acute infective episode

Method Patients admitted to the infection or acute medicine admission units of a major Scottish teaching hospital and commenced on antibiotic therapy after admission were included. Semi-structured face-to-face interviews were conducted using a pre-piloted interview schedule guide that focused on gathering information about patient behaviours and experiences prior to admission to hospital with an acute infection. Interviews were audio-recorded, transcribed verbatim and analysed using the Framework Approach. Emerging themes were matched to the Theoretical Domains Framework of behavioural determinants.

Results Twenty-one patients consented to participate and 18 transcripts were suitable for analysis. The most common infections were those of the skin, soft tissue and respiratory tract. From the patients' perspectives, behavioural determinants that appeared to impact their admission to hospital were principally their knowledge, beliefs of consequences, the environmental context and resources (mainly out-of-hours services), social influences and their own emotions. Determinants such as knowledge of the signs and symptoms, beliefs of consequences and environmental context were facilitators of health seeking behaviours. The main barriers were a lack of awareness of consequences of infection potentially leading to delayed admission impacting infection severity, stay in secondary care and resource utilisation.

Conclusions This study has shown that any initial patient-centred intervention that is proposed to change patient behaviour needs to be based on behavioural determinants emerging in this research. The intervention may include aspects such as patient education on resources available out-of-hours and ways to access the healthcare system, education on recognising signs of infection leading to prompter treatment and positive reinforcement for patients who present with recurrences of infection.

Keywords behaviour, hospital admission, infection, theoretical domains framework

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Introduction

Globally, infection-related admissions to secondary care absorb substantial healthcare resources. In Scotland there were in excess of 144,374 episodes of infection-related hospital admissions, largely respiratory and soft tissue, for the financial year 2014/2015.¹ Delayed hospital presentation may contribute to severe and potentially life-threatening complications such as septicaemia.² In contrast, those patients who are hospitalised with infections that could be

safely managed in the community are exposed to unnecessary hazards such as healthcare-associated infections.²

While there may be many people involved in the decision to admit patients to secondary care, there is a dearth of literature focusing on the patient's perspective. Understanding these behaviours and their determinants may facilitate the development and implementation of interventions to promote appropriate behaviours.

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In an attempt to improve the patient journey, studies have described patients' experiences of hospital admission for chronic obstructive pulmonary disease and cardiac conditions.^{3,4} There is limited evidence of patients' perspectives of their flow in emergency departments and discharge from surgical units.^{5,6} One weakness of these studies is the absence of behavioural theory to provide an understanding of associated behavioural determinants leading to a patient's admission to hospital. Research to explore patients' behaviours and determinants of behaviour around admission to hospital for an acute infective episode is therefore much needed.

The UK Medical Research Council (MRC) guidance on 'Developing and evaluating complex interventions' emphasises the role of cognitive, behavioural and organisational theories in the development-evaluation-implementation process of an intervention. When developing an intervention, the MRC recommends this to be based on a 'coherent theoretical basis' as this is more likely to be effective and bring about change.⁷

The aim of this study was to generate an initial description and understanding of the determinants of patients' behaviours surrounding admission to hospital for an acute infective episode. The findings will be used as a basis to propose a patient-centred intervention using the MRC guidance, with a focus on preventing delays in hospital admissions.

Methods

Design

This was a qualitative study comprising face-to-face semi-structured interviews.

Setting and participants

The study was carried out in the Infection Unit and Acute Medical Admissions Unit of a 900 bed teaching hospital in the north-east of Scotland. Patients aged 16 and over, admitted to hospital (either self-referred or referred by their primary care team) due to an infective episode and commenced on antibiotics were invited to participate by their consultant physician. The definition of the infective episode was based on the field diagnosis made by the admitting secondary care team. Patients were provided with full study information and signed an informed consent prior to interview. Participants could withdraw from the study at any time. Those deemed by their consultant physician to have cognitive impairment, limited understanding of English or other special communication needs were excluded.

Development of interview schedule

The questions in the semi-structured interview schedule were devised to provide an understanding of patients' perspectives of clinical presentation and experiences leading to admission, with an emphasis on triggers or determinants of behaviour. The interview schedule was reviewed for credibility by members of

Box 1. Study interview schedule guide and prompts where relevant

| Key questions | Prompts to elicit more in-depth response |
|---|---|
| Before you were admitted to hospital, can you describe what your symptoms were and when they started? | When did the symptoms start? What sort of symptoms were they? Have you ever had anything similar in the past? |
| Did you seek help/ advice from anyone? | Was this from: <ul style="list-style-type: none"> • GP • Community pharmacist • Practice nurse • NHS24 • Family/friends Trigger to seek advice? |
| In your opinion, was this service easily accessible and useful? | |
| Are there any further positive and negative comments you would like to make about the service? | |
| Is there anything that could have been done better/quicker? | |
| Did you have any treatment for your condition prior to admission? | <ul style="list-style-type: none"> • Antibiotics prescribed by doctor • Painkillers bought over the counter from the pharmacy Was this treatment prescribed or was this self-treatment? |
| Is there anything you would do differently if this happened again? | |
| Is there anything else you wish to add? | |

the research team providing breadth of expertise in medicine, pharmacy and research. Key questions and prompts used to elicit further in-depth information are provided in Box 1. This was followed by two pilot interviews [conducted by AT] to establish patient understanding of the interview questions and the duration of the interview. These interviews were not included in the final dataset and no changes were required to the interview schedule.

Data collection and analysis

Convenience sampling of patients was conducted over a five-week period during November and December 2012. A sample size of around 20 was considered appropriate to achieve data saturation.⁸ Interviews of about 10–20 minutes

Table 1. Description of TDF domains⁹

| TDF Domains | Description |
|--|---|
| Knowledge | An awareness of the existence of something |
| Skills | An ability or proficiency acquired through practice |
| Social/professional role and Identity | A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting |
| Beliefs about capabilities | Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use |
| Optimism | The confidence that things will happen for the best or that desired goals will be attained |
| Beliefs about consequences | Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation |
| Reinforcement | Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus |
| Intentions | A conscious decision to perform a behaviour or a resolve to act in a certain way |
| Goals | Mental representations of outcomes or end states that an individual wants to achieve |
| Memory, attention and decision processes | The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives |
| Environmental context and resources | Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour |
| Social influences | Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours |
| Emotion | A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event |
| Behavioural regulation | Anything aimed at managing or changing objectively observed or measured actions |

were conducted in private areas within the study wards and digitally recorded. To enhance data trustworthiness, each interview was conducted by two trained researchers who were familiar with the topic guide. Audio recordings were transcribed verbatim and checked for transcribing accuracy by a member of the research team. Patient demographics (age, sex, GP diagnosis and hospital diagnosis) were obtained from patients' medical notes. Transcripts were analysed independently by two researchers (AT and DS, with the first three interviews also analysed by VP) using the Framework Approach following the steps of data familiarisation, identifying constructs, indexing, charting, mapping, and interpreting.⁹

The Theoretical Domains Framework (TDF) was used as the coding framework to allow elucidation of behavioural determinants. The TDF is a framework of theories of behaviour change which was developed through expert panel consensus and validation by a group of psychological theorists, health service researchers and health psychologists.⁹ It was derived from 33 psychological theories and 128 theoretical constructs, which are organised into 14 overarching domains, as described in Table 1.

Research governance

The project was reviewed and approved by the North East of Scotland Research Ethics Committee (12/NS/0075) and NHS Grampian Research and Development Committee (12/NS/0075 – 2012RG007).

Results

Participants

Twenty-one patients consented, 20 were interviewed (one was unable to be interviewed due to his clinical condition) and 18 interviews were analysed (there were two recording failures).

The age range was 18–85 years (median age 59), ten were male. Seven patients were referred directly to hospital following advice provided by the primary care team; the most common diagnosis made in primary care was cellulitis ($n = 5$). The most common diagnosis on admission made by the admitting secondary care team was skin and soft tissue infection ($n = 10$) followed by infections involving the respiratory tract ($n = 5$).

Key themes are described in relation to TDF domains. The field diagnosis referred to below indicates the working diagnosis following the patient's hospital admission and review by the admitting secondary care team. Further demographic information is provided at Table 2.

Domain 1 Beliefs about consequences

A key theme emerging from the interviews was that patients' perceptions of the outcome of the infective episode largely depended on the symptom presentation and progress. A patient's discernment of the symptom severity was a major

Table 2. Characteristics of patients interviewed

| Case no | Age | Sex | Diagnosis prior to hospital admission made by primary care team as recorded in hospital medical records | Field diagnosis on admission to hospital ward as recorded by admitting secondary care team |
|---------|-----|-----|---|--|
| 1 | 73 | F | NA - patient taken directly to hospital by ambulance | Cellulitis |
| 2** | 55 | M | Right side neck lump | Carbuncle of neck secondary to <i>S aureus</i> |
| 3** | 58 | F | Cellulitis; chest infection | Cellulitis; chest infection |
| 4 | 21 | M | Cellulitis | Cellulitis |
| 5 | 65 | M | Traumatic ulcers on both shins | Bacteraemia with endocarditis |
| 7 | 29 | M | NA - patient taken directly to hospital by ambulance | Cellulitis |
| 8 | 60 | M | Cellulitis | Cellulitis |
| 9 | 73 | F | Infected insect bite | Cellulitis |
| 10 | 46 | M | Acute gastroenteritis | Still awaiting investigation results |
| 11 | 18 | F | NA – patient advised to go directly to hospital A&E | Acute tonsillitis |
| 12 | 39 | M | Cellulitis | Cellulitis |
| 14 | 89 | F | Urinary tract infection | Biliary sepsis |
| 16 | 80 | F | Community acquired pneumonia | Pneumonia |
| 17 | 85 | F | Lower respiratory tract infection | Lower respiratory tract infection |
| 18 | 60 | M | NA – patient taken directly to hospital by ambulance | Community acquired pneumonia |
| 19 | 81 | M | NA – patient admitted directly by emergency GP | Lower respiratory tract infection |
| 20 | 35 | M | NA – patient taken directly to hospital by ambulance | Cellulitis |
| 21 | 42 | M | Cellulitis | Cellulitis |
| 22 | 62 | M | NA – patient taken directly to hospital by ambulance | Community acquired pneumonia |
| 23 | 55 | M | Urinary tract infection | Sepsis secondary to urinary source |

**Recording failure

determinant of whether the patient sought professional advice immediately or whether he delayed seeking advice.

‘...nothing, just a wee bit of blood and I never thought anything about it. I just put my foot in water and bubble bath and soaked it for a wee while.’ [Interview 1, field diagnosis, cellulitis]

‘I hadn’t tried to contact my own doctor because it was a cold. You can’t see your own doctor about a cold.’ [Interview 19, field diagnosis, lower respiratory tract infection]

‘...I started to have a sore throat on Friday but I really ignored it ‘cos [because] it was just a normal sore throat.’ [Interview 11, field diagnosis, acute tonsillitis]

In some cases, patients sought advice thinking that their symptoms were unrelated to the infection.

‘I thought I’d broken my arm first of all.’ [Interview 1, field diagnosis, cellulitis]

‘...I looked at the symptoms and wondered if this was a DVT [deep vein thrombosis] thing and went to the doctor next day.’ [Interview 8, field diagnosis, cellulitis]

Some patients had already experienced similar infections in the past and showed positive reinforcement due to these previous experiences. They were aware of actions required to take due to their symptom presentation and of the potential consequences of the infection.

‘...I thought it was cellulitis because I’d had cellulitis previously and it was similar sort of symptoms and it was then I thought I had to call GMEDS [previously known as GDOCS: Emergency out-of-hours medical service] and I went up there and it was confirmed.’ [Interview 12, field diagnosis, cellulitis]

‘Yeah I had it [sepsis secondary to a urinary source] about two years ago. That’s why I knew I should have been admitted to hospital.’ [Interview 23, field diagnosis, sepsis secondary to urinary source]

Domain 2 Knowledge

Knowledge and recognition of the patient’s symptoms and their severity was especially linked to a previous episode(s) of a similar infection. This enhanced knowledge largely influenced the action for the patient to take and an insight into the consequences of the infection. This links in closely to Domain 1 – Beliefs about consequences.

'...well the other symptoms are that your leg, it starts to turn red. And swollen and is really, really painful, that's one of the things that cellulitis is so. And obviously I had a temperature as well.' [Interview 12, field diagnosis, cellulitis]

'I've had malaria before so it was similar to malaria.' [Interview 10, no field diagnosis available]

Most patients showed a lack of knowledge with a lack of recognition of symptoms indicating an infection or the severity of the condition.

'I didn't associate these little scratches on my leg with anything else.' [Interview 5, field diagnosis, bacteraemia with endocarditis]

'So I don't know whether that's a normal symptom of getting pneumonia.' [Interview 19, field diagnosis lower respiratory tract infection]

Some patients perceived their knowledge to be sufficient to enable them to self-care, including self-medication with over-the-counter products.

'I thought it [Strepsils™] would make it better.' [Interview 11, field diagnosis, acute tonsillitis]

'I bought them [painkillers] myself.' [Interview 23, field diagnosis, sepsis secondary to urinary source]

Domain 3 Environmental context and resources

Health professionals, almost exclusively GPs or out-of-hours services, were the main resource which patients accessed and impacted their admission to hospital. This was despite other potential sources of advice such as the community pharmacy or practice nurse.

'I went to the doctor of course' [Interview 14, field diagnosis, biliary sepsis]

'Well I realised that I needed some help [after vomiting blood] so I phoned GDOCS.' [Interview 16, field diagnosis, pneumonia]

Overall, patients reported good and easy access to pre-admission advice which included making an emergency appointment at the GP to be assessed on the same day or the GP calling an ambulance with a referral to hospital.

'...the ambulance was no time in coming after the doctor called.' [Interview 17, field diagnosis, pneumonia]

A few patients reported a more negative experience, particularly in delays to hospital admission by out-of-hours GP services.

'I would [complain about] GDOCS for not admitting me. Because I phoned them back on Saturday night. And they still

weren't admitting me...I have no faith in the GDOCS at all now.' [Interview 23, field diagnosis, sepsis due to urinary infection]

Domain 4 Social influences

If patients had not experienced the condition previously, social influences, largely from family members, influenced the patient's decision to seek medical advice.

'...so my wife phoned my daughter and then convinced me to go [to hospital].' [Interview 19, field diagnosis, lower respiratory tract infection]

'...my partner I think the next day after saw pus and it was almost she described it as a white foam coming out...And then she was the one that suggested to get me to hospital' [Interview 21, field diagnosis, cellulitis]

One patient was working abroad when the symptoms manifested. The main social support reported here was a work colleague.

'...and it was my boss, looked at me and said no, just go home and it was him that decided to send us home [to the UK] basically.' [Interview 10, no field diagnosis available]

Domain 5 Emotions

Very few patients referred to emotions. One patient reported anxiety as part of the infective episode.

'I was crying and I was shouting 'Oh no, no, no!' going upstairs and coming downstairs...So it went on for a few hours and so my wife phoned my daughter and they convinced me to go to GDOCS, they made an appointment with GDOCS.' [Interview 19, field diagnosis, lower respiratory tract infection]

Domain 6 Behavioural regulation

The direct experiences as a result of the current infective episode leading to this hospital admission, played a role in determining how patients would behave if they had a similar experience in the future. The main change in behaviour reported by the patients was a desire to seek professional advice (mainly from a doctor or self refer to hospital) at an earlier stage of symptom onset.

'Oh aye, I would come in right away like, I wouldn't wait so long.' [Interview 7, field diagnosis, cellulitis]

'I'd see a doctor more quickly...I definitely left it too late, I know that.' [Interview 16, field diagnosis, pneumonia]

A patient reported a positive direct experience from an out-of-hours NHS service as a result of this episode, causing a change in the patient's perception of this service.

'...going to GDOCS quite willingly now...they've got your details. They can computerise everything now.' [Interview 19, field diagnosis, lower respiratory tract infection]

Some patients believed that they would be more able to self-manage their symptoms as a result of this direct experience, potentially due to an increased belief in own capabilities and self-confidence.

'...if I could get antibiotics I could start it myself really.' [Interview 18, field diagnosis, community acquired pneumonia]

'...I would immediately make sure I got it sterilised and sanitised dressed properly.' [Interview 21, field diagnosis, cellulitis]

A patient expressed a desire to be more involved in decision making in the case of a similar future episode.

'Probably discuss the drug levels more with the doctor.' [Interview 22, field diagnosis, community acquired pneumonia]

Information about the following domains did not emerge from this set of interviews: skills, social/professional role and identity, beliefs about capabilities, optimism, reinforcement, intentions and memory, attention and decision processes.

Discussion

Key findings of this research are that, from the patients' perspectives, several determinants appeared to impact their admission to hospital, principally their knowledge, beliefs of consequences, the environmental context and resources (largely the GP), social influences and their emotions. Their experience of the admission was likely to impact their future behaviours of self-management and seeking help if the infective presentation recurred.

There are several strengths to this research including the use of an accepted theoretical framework and the measures taken to promote research trustworthiness, particularly the elements of credibility and dependability enhance research rigour.^{7,9,10} There are, however, several limitations and as such the findings should be interpreted with caution. The research was conducted within one hospital in the north-east of Scotland hence the findings are not necessarily transferable to all infective admissions in the UK or beyond. Furthermore, the sample size of 18 may not have been sufficient for data saturation to have occurred. In addition, while there were attempts to promote credibility of findings (i.e. that they were congruent with reality), it is possible that some interviewees may not have described their perspectives accurately. This research focused solely on the patient perspectives rather than the perspectives of all of those involved in the admission. The study also included a broad category of patients with different types of infective episodes such that any subtle differences in patient experience may not have been identified. Despite these limitations, this qualitative research has added to the very limited knowledge base around admissions to hospital.

To our knowledge this is the first published study that reports qualitative research from the patient perspective in terms

of the admission to hospital with an acute infection and associated behavioural determinants. While some of these determinants such as knowledge of the signs and symptoms, beliefs of the consequences and environmental context were facilitators that prompted health seeking behaviours, some were also barriers such as lack of awareness of consequences of infection. The latter emerged as the major barrier towards seeking medical health and it may be that these barriers led to delayed admission affecting infection severity, length of stay in secondary care and resource utilisation. Many patients reported that it was only when the infection had deteriorated markedly did they seek medical advice and often this was only at the insistence of a relative or friend. Social influences therefore emerged as playing a major role in determining behaviour leading to hospital admission.

Evidence indicates that the development and implementation of interventions based on the MRC framework are more likely to be effective and sustained.⁷ A key element of the framework is the application of theory to elicit behaviour change. The TDF has been used extensively within healthcare-related research; areas of study have included: smoking cessation, physical activity, hand hygiene, acute low back pain, and schizophrenia.¹¹ Theories of behaviour change have been synthesised into a set of theoretical groupings: introducing a thematic series on the theoretical domains framework.¹¹ There is an absence of research surrounding behaviour change in patients with infection. Using the TDF as part of intervention development requires mapping those behavioural determinants requiring change to specific behaviour change techniques. Michie et al. reported a consensus study of an agreed hierarchically structured taxonomy of 93 behaviour change techniques clustered into 16 groups which have been mapped to TDF domains.^{12,13} In relation to this study, education emerges as the main patient-centred intervention likely to encourage behaviour change. This is discussed in greater detail below.

This study has shown that there were three main groups of patients admitted for an acute infective episode. One group presented with a first episode of infection (naive group). One group had similar symptoms in the past but the previous diagnosis had been non-infective (example DVT, fracture). Patients who linked the current symptoms to their previous diagnosis felt they were non-infective again, resulting in a delay in presentation to a healthcare professional (delayed group). The third group had similar symptoms in the past and therefore were able to make a quicker self-diagnosis and presented earlier to a healthcare professional and start treatment earlier (experienced group).

Due to these varied situations, a single intervention for all patients admitted for an acute infective episode might not be appropriate. Therefore, healthcare services need to target these patient groups separately. One of the key issues that has been identified in this research is lack of understanding of the infection and action to take when symptoms start. This applies to the naive and the delayed groups. It is likely that education about infections commonly encountered in the community,

targeted at this section of the population, will allow for earlier patient recognition and help patients gain quicker access to a healthcare provider and more targeted antibiotics with the potential of reducing hospital admissions. Such information can be provided on websites and may include video clips of patients' experience and symptomatology. Such information would also aid patients to better understand the resources available to them and access the right healthcare professional at the right time. This should provide reassurance, encourage patients to seek prompt treatment and help reduce the risk of negative emotions.

The experienced group will already be aware of their diagnosis having experienced this infection before (e.g. recurrent cellulitis or recurrent pneumonia). For this reason, such patients would already know what symptoms to look for and these will aid as positive reinforcement. Their past experience with the healthcare setting may also provide reassurance that the current intervention selected is appropriate and will address their needs. Such patients are more likely to seek earlier medical advice and are more likely to use available interventions in the future.

There needs to be further research employing a case study methodology involving the generation of data from multiple sources and perspectives, including patients and their families/carers and health professionals, to provide a comprehensive understanding of behaviours and behavioural determinants surrounding infection-related admissions to hospital. There may also be merit in focusing on patients with admissions deemed to have been inappropriate or delayed. These could then further inform development and testing of theory-based interventions.

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